STATE OF IDAHO, DEPARTMENT OF AGRICULTURE
DIVISION OF AGRICULTURAL RESOURCES

IN RE SMOKE MANAGEMENT AND CROP RESIDUE DISPOSAL ACT	)))))	**DETERMINATION REGARDING ECONOMICALLY VIABLE ALTERNATIVES TO THERMAL DISPOSAL OF CROP RESIDUE**

This document is in regards to the *Smoke Management and Crop Residue Disposal Act* (Smoke Management Act) codified at Idaho Code § 22-4801 *et seq*. The Smoke Management Act requires that I make a determination that no economically viable alternatives to burning are available to Idaho producers. In 2003, I found that no economically viable alternatives to field burning were available for the purpose of disposing of crop residue, developing physiological conditions conducive to increased crop yields, or controlling diseases, insects, pests or weeds. Because scientific research is on-going in the area of crop residue disposal, I have decided to re-evaluate the determination I issued on July 22, 2003, certifying that no economically viable alternatives to field burning are available to Idaho producers. This determination supersedes my previous determination issued in 2003.

For the purpose of this determination, I construe the term "economically viable alternatives" to mean an alternative to thermal residue disposal that (1) achieves agricultural objectives comparable to thermal disposal for the factors listed in § 22-4803(1)(a)-(c) and (2) allows growers to experience a financial rate of return over the short- and long-term consistent with the rate of return that would occur if thermal residue disposal were utilized. I am required by the Smoke Management Act, for purposes of determining whether economically viable alternatives to field burning exist, to limit my determination to those alternatives that provide for the disposal of crop residue, create physiological conditions that will increase crop yields, or will control diseases, insects, pests or weed infestations. Specifically, the Smoke Management Act provides in Idaho Code § 22-4803(1):

> The open burning of crop residue grown in agricultural fields shall be an allowable form of open burning when the provisions of this chapter, and any rules promulgated pursuant thereto, and the environmental protection and health act, and any rules promulgated pursuant thereto, are met, and when no other economically viable alternatives to burning are available, as determined by the director, for the purpose of:
>
> (a) Disposing of crop residue;
> (b) Developing physiological conditions conducive to increased crop yields; or
> (c) Controlling diseases, insects, pests or weed infestations.

I have instructed my staff to compile all available information on crop residue disposal, including emails, letters, memoranda and other documents received from the public along with scientific research related to crop residue disposal. I have reviewed the documents compiled by my staff and those documents submitted by the general public. These documents and the documents comprising the Administrative Record supporting the determination issued in 2003 are the basis for my determination and I incorporate them herein by reference (hereinafter "Administrative Record" or "AR"). An index comprising the list of documents that I have reviewed is attached to this memo. The following represents my determination as directed by the Smoke Management Act.

NON-THERMAL METHODS OF CROP RESIDUE DISPOSAL

If thermal disposal of crop residue is not utilized as a method of managing post-harvest crop residue, a mechanical technique must be employed to remove crop residue from the field. Post-harvest crop residue must be managed in order to create physiological conditions on the field to maintain seed yields, manage disease, weeds, and pests, and prepare the field for subsequent harvest.

A number of mechanical residue removal techniques are currently being studied as possible alternatives to thermal disposal of crop residue. Common techniques include raking, flailing and baling the residue or vacuum sweeping the residue off from the field. *See* Glen A. Murray Paper; AR B-191. The mechanical raking technique may employ a needle-nose rake with stiff tines to scratch the residue and thatch to remove debris from around the crown of the plant. *See* Effects of Various Types of Post-Harvest Residue Management on Kentucky Bluegrass Seed Yield in Central Oregon, On-Farm Results from 1991-1996; AR F36-983. The residue is windrowed and then baled and removed from the field. *See id.* Alternatively, a close-clipping and vacuuming machine may remove the residue and leave the stubble at approximately one (1) inch in height. *See id*. Mechanical residue removal, regardless of the particular technique employed, must remove at least 90 percent of the residue or shorten the stubble height to less than two inches in order to produce similar results to thermal disposal of crop residue. *See* Potential Alternatives to Field Burning in the Grand Ronde Valley; AR E25-832.

NON-THERMAL DISPOSAL PRODUCTION/MARKETING COSTS

Capital investments are required to convert from a crop residue management system utilizing field burning to a mechanical crop residue management system. Capital costs vary depending upon the equipment utilized, which may include a needle-nose rake wheel and baler or a vacuum machine in addition to storage costs discussed, which are discussed below. The costs associated with financing these capital investments are estimated at 10 percent of the principle amount financed. *See* The Effect of the "No-Burn Ban" on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State at 2; AR H9-1499.

Once residue has been harvested and baled it must be stored or transported to market. If the residue is stored, it must be protected from moisture in order to preserve it for later use. *See* Status Report on Alternative Uses For Grass Straw at 8; AR E1-633. Improperly stored residue will deteriorate to the point that it is only suitable for disposal or composting. *See id.*

Temporary storage costs incurred in utilizing tarps to cover the residue are estimated at $4.00 per ton per year assuming that the tarps will last for two years. *See id.* Permanent hay buildings are estimated at $7.00 to $10.00 per ton per year, or approximately $50.00 per ton for the initial capital cost. *See id.*

Transportation costs vary depending on the location where the residue must be transported from and the availability of trucks to haul the residue to the desired market. In addition, large hay bales are costly to transport due to the fact that they do not fit efficiently on hay trucks. *See id.* The fact that trucks cannot be fully loaded increases the transportation costs. *See id.* Transportation costs for producers in Spokane County, Washington to haul residue to a nearby feed facility are approximately $25.00 per ton. *See id.* Local transportation costs range from $10.00 to $20.00 per ton for a 100-150 mile round trip.

CROP RESIDUE USES AND SALE

Once the crop residue is mechanically removed from the field, a number of uses are available for crop residue that may off-set some of the additional costs associated with a mechanical residue management regime. Three broad categories of alternative uses for crop residue are identifiable from reviewing the Administrative Record. They are off-farm disposal, on-farm use and off-farm use. *See* Status Report on Alternative Uses for Grass Straw, Washington State Department of Ecology at 11; AR E1-636. Specific crop residue uses are identified within one of the three categories discussed separately below.

Off-Farm Disposal

Livestock Feed: Crop residue that is utilized for livestock feed has been estimated to bring returns to producers ranging from $0.00 to $40.00 per ton. *See* UI Bluegrass Seed Producers Earn Less Without Field Burning at 1; AR H7-1491. Drought conditions play an important role in determining the market value for baled crop residue used for livestock feed. *See id.* When drought conditions ease in Montana the market could quickly become saturated if Idaho producers enter the livestock feed market. *See id.* Accordingly, livestock feed markets are uncertain for Idaho producers.

Incineration or land fill: Crop residue may be disposed of in off-farm incinerators or land fills. No return is expected on this crop residue disposal technique and could increase farmer's costs. It is anticipated that producers would utilize an incinerator or land fill only in those instances where no other market for the residue is available and storage is unavailable.

On-Farm Use

Soil Amendments: Composting of crop residue returns straw residue back to the soil, increasing the amount of organic matter. *See* Status Report on Alternative Uses for Grass Straw at 11; AR E1-636. Potential benefits of using the crop residue as a soil amendment includes erosion protection, reduced fertilizer requirements, retention of soil moisture, and improved seed germination and crop growth. *See id.* Composting costs range from $15.00 per acre to $30.00 per acre. *See id.* However, current composting technology does not address the unique problems faced by producers attempting to compost straw on a large farm-scale. *See* Composting Grass Seed Straw at 1; AR E2-666. A few options are available to producers, but "[a]dditional research is needed to assess long-term economic costs and agronomic benefits, and to further refine techniques and equipment." *Id.*

Alternate Year Harvest: An alternate year production theory is currently being studied on a North Idaho farm. *See* David Mosman Ranch Letter at 2; AR D1-455. This production theory consists of harvesting a seed crop every other year. *See id.* Chemicals are applied to the field to provide for residue suppression and weed control. *See id.* Specialized equipment will need to be purchased in order to manage crop residue in this manner. *See id.* This experiment is currently being conducted in long-term field experiments and does show some preliminary results that are promising. *See* University of Idaho Letter at 1; AR D4-533. Because these experiments are in progress, no conclusive data are available to determine the economic viability of this crop residue management alternative. *See id.*

Off-Farm Use

Pulp and Paper: No current pulp mill utilizes agricultural residues for the purpose of producing pulp and paper products. *See* Paper Manufacturing Using Agricultural Residues from Pacific Northwest Farmlands at 6; AR E23-782. It is possible to produce a relatively cost effective pulp for the corrugated medium sector utilizing crop residue. *See id.* However, current data are preliminary, and the research was performed on a small scale. *See id.*

Power Generation: Crop residue could potentially generate up to 400 to 425 megawatts of electricity annually. *See* Straw to Energy? It Might Be Worth a Try at 1; AR E28-841. However, significant barriers to entry in this market include the construction of new facilities and the cost of storing and transporting the straw. *See* Status Report on Alternative Uses for Grass Straw at 11; AR E1-636. Crop residue is not currently being utilized as a source of commercial power generation.

Bio-Fuels: Ethanol plants could potentially utilize crop residue as a raw material. *See id.* However, the current ethanol manufacturing facilities under construction in Washington do not have plans to utilize crop residue as feedstock for ethanol manufacture. *See id.*

NON-THERMAL RESIDUE DISPOSAL AND CROP YIELDS

Under a post-harvest non-thermal crop residue disposal system, crop yields will be affected negatively. In Spokane County, Washington, a dry land Kentucky bluegrass producer utilizing a non-thermal residue disposal system may realize four years of production before the bluegrass stand must be re-established or rotated out of production. *See* The Effect of the "No-Burn Ban" on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State at 8; AR H9-1505. However, if thermal residue disposal is utilized, that same Spokane County producer could expect a productive bluegrass stand life of at least seven years. *See id.* Thus, non-thermal residue disposal has the practical effect of decreasing crop yields by shortening the productive stand life of the bluegrass field; *i.e.*, the dry land farmer is required to re-establish the field more frequently to maintain a yield level comparable to what would be achieved employing thermal disposal methods.

Non-thermal crop residue disposal may also affect the pounds of clean seed harvested annually. In the first two years a crop is harvested, the yield is comparable to that of fields utilizing a thermal crop residue disposal system. *See id.* However, in the third year and fourth years of production, a Kentucky bluegrass stand may yield up to 45 to 60 percent less clean seed. *See* Assessment of Non-Thermal Bluegrass Seed Production at 13; AR D2-469. Yield comparisons between similarly situated Kentucky bluegrass stands in North Idaho and Eastern Washington show that fields not being burned produce approximately 173 pounds per acre less than fields that are burned over a three year period, with yields trending downward. *See id.* It may be possible for a post-harvest non-thermal crop residue disposal system to maintain yields that are comparable with those fields that burn crop residue, but fertilizer and chemical inputs must be increased. *See id.* at 14, AR D2-470. These higher yields nonetheless can be maintained only for two or three production years before the bluegrass stand must be re-established. *See id.*

NON-THERMAL RESIDUE DISPOSAL AND RATES OF RETURN

The cost of producing bluegrass seed utilizing a post-harvest mechanical crop residue disposal system depends primarily on three key factors: (1) the production life of an established bluegrass seed field; (2) the expected annual yields; and (3) the price that can be obtained for bluegrass residue. *See* The Effect of the "No-Burn Ban" on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State at 18; AR H9-1515. As discussed above, the production life of an established bluegrass seed field and the expected annual yields from these bluegrass fields are affected negatively by restricting the use of post-harvest thermal crop residue management.

The third factor, price obtained for bluegrass residue, has been valued in a range from $0.00 per ton to $40.00 per ton. *See supra* at 3. Recently, baled bluegrass residue has been worth approximately $30.00 to $40.00 per ton. *See* Assessment of Non-Thermal Bluegrass Seed Production at 14; AR D2-470. This recent market price, however, appears to be inflated artificially due to drought conditions in Montana and may not be representative of long-term pricing. *See id.* at 15, 471.

A Washington State University Study issued in 2001 estimated the break-even price for Spokane County Kentucky bluegrass producers to be 58 cents per pound when thermal crop residue management was employed versus 84 cents per pound when non-thermal crop residue management practices were utilized. *See* Effect of the "No-Burn Ban" on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State at 21; AR H9-1518. The study concluded that, "under current conditions in Spokane County, it is estimated that the cost of producing bluegrass seed under the 'no-burn ban' has increased the cost per pound of production by 25¢ or more"—an increase of approximately 43 percent—even where crop residue sold for $31 per ton. *Id.* An expert witness appearing on behalf of opponents to crop residue burning proffered as a mid-point estimate approximately $55.00 to $60.00 per acre in additional costs for North Idaho Kentucky bluegrass producers if non-thermal crop residue disposal is required. *See* Deposition of C. Richard Shumway, Ph.D. at 85; AR J-2003 AR Tab 18. A third study has estimated the increase in production costs accompanying use of non-thermal disposal to be $70 per acre. Concise Explanatory Statement, Agricultural Burning, Grass Seed Field Burning Alternative Certification Amendment at 16; AR J-2003 AR Tab 16. The administrative record thus indicates that, regardless of which study or testimony is reviewed, rates of return will be reduced significantly for dry land Kentucky bluegrass farmers in Idaho if they are prohibited from using thermal crop residue disposal methods.

It should be noted that comparisons drawn between Kentucky bluegrass producers in the ten northern Idaho counties specified in § 22-4803(3) and Washington State Kentucky bluegrass producers were limited to those farmers in Spokane County, Washington. The comparisons were limited to Spokane County producers because of the proximity of North Idaho producers with Spokane County producers and the environmental similarities, *i.e.*, similar length of growing seasons, steep farmland terrain, and annual rainfall. Most important is the fact that both North Idaho and Spokane County farmers grow crops under a dry land production system due to the lack of available water for irrigation. Dry land farming conditions also significantly limit the availability of alternative crops to these producers.

SUMMARY AND FINDINGS

A number of crop residue markets have been explored since the state of Washington significantly reduced thermal disposal of crop residue in 1996. *See* North Idaho Farmers Letter at 1; AR B-60. A task force convened by the state of Washington studied several alternative disposal techniques but failed to find one effective or feasible method for utilizing post-harvest crop residue. *See id.* Problems associated with finding a feasible crop residue disposal alternative are prohibitive capitalization costs, more crop residue is produced than can be consumed, unprofitable alternatives or alternatives requiring subsidization, variation in straw types and content, and limited markets for crop residue products. *See id.* New economic burdens placed upon producers under a mechanical crop residue management regime have been estimated at approximately $70.00 per acre. *See* Concise Explanatory Statement, Agricultural Burning, Grass Seed Field Burning Alternative Certification Amendment at 16; AR J-2003 AR Tab 16; *see also* Deposition of C. Richard Shumway, Ph.D. at 85; AR J-2003 AR Tab 18. In addition, these costs compound the decrease in profit realized from a reduced stand life and the possibility of a reduced yield under a mechanical crop residue management scenario. *See* Deposition of Arthur Schulteis at 5; AR J-2003 AR Tab 3. Even the most optimistic of economic off-sets associated with a mechanical crop residue management system, *i.e.*, $40.00 per ton return on baled straw utilized as livestock feed, are not sufficient to cover the likely costs of converting from field burning to a mechanical crop residue management system. Therefore, based on my review of the Administrative Record, I find that no economically viable alternatives for crop residue disposal are available for Idaho producers currently utilizing a thermal disposal protocol for crop residue. I further find with reference to the three purposes identified in § 22-4803(1):

(a) <u>Disposing of crop residue:</u> The Administrative Record indicates that alternative markets for baled bluegrass residue are speculative and equipment, storage, transportation, and additional inputs are cost prohibitive.

(b) Developing physiological conditions conducive to increased crop yields: The Administrative Record indicates that thermal production of Kentucky bluegrass is necessary to achieve adequate thinning of the bluegrass stand and to provide adequate light to the grass crowns and tillers.

The Administrative Record regarding mechanical removal of Kentucky bluegrass residue indicates that non-thermal bluegrass seed production systems will reduce the consecutive number of bluegrass seed crops from seven or more to approximately three crops. These data do not support the economic viability of a non-thermal disposal protocol requiring Idaho producers to harvest a substantial seed crop for approximately seven to ten years in order to recoup high input, stand establishment and continuing management costs.

(c) Controlling diseases, insects, pests or weed infestations: The Administrative Record indicates that Kentucky bluegrass stands utilizing a mechanical post-harvest crop residue management regime requires significantly higher input costs to control disease, insects, pests, and weeds. These input costs include increased fertilizer, pesticide, and herbicide applications as well as increased petroleum use.

Although these findings are issued based on research and comments reviewed dealing primarily with Kentucky bluegrass, I find no basis to conclude that economically viable alternatives to thermal crop residue disposal exist with respect to any other crop in Idaho where residue is removed through thermal disposal.

DATED this 28th day of June 2004.

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Director,
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Idaho State Department of Agriculture

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1038-1045	F50	High Straw-Conservation Grass Seed Production to Mitigate Agricultural Impacts in the Pacific Northwest; Progress Reports FY01 & FY03	R.P. Dick, R.A. Christ, J.J. Steiner, S.M. Griffith
1046	F51	How Bluegrass Seed Is Produced in Idaho - Abstract (1976)	Summarized by John Holman; R.D. Ensign
1047-1048	F52	Identification of Morphological markers for the Transition To Flowering in Kentucky Bluegrass as an Aid to Crop Management; Progress Report FY96	Anne W. Sylvester; glenn Murray, Jeff Griffin, Vickie Parker-Clarke, Roechs Farm, Jacklin Seed Co.
1049-1050	F53	Inflorescence Production in Plants and in Seed Crops of Poa Pratensis L. and Festuca Rubra L. as Affected by Juvenility of Tillers and Tiller Density - Abstract (1984)	Summarized by John Holman; W.J. Meijer
1051	F54	Influence of Fertilizer and Residue Management on Grass Seed Production - Abstract (1978)	Summarized by John Holman; C.L. Canode, A.G. Law

1052	F55	The Influence of Nitrogen Fertilizer, Row Spacing, and Irrigation on Seed yield of Nine Grassed in Central Saskatchewan - Abstract (1966)	Summarized by John Holman; W.L. Crowie
1053	F56	Influence of Nitrogen Fertilizer and Mechanical Stubble Removal on Seed Production of Kentucky Bluegrass in Manitoba - Abstract (1989)	Summarized by John Holman; D.J. Thompson, K.W. Clark
1054-1056	F57	Influence of Post Harvest leaf and Tiller Development on Seed Yield of Grass Seed Crops;	Thomas G Chastain, William C Young III, Gary M Banowetz
1057	F58	Influence of Row Spacing and Nitrogen Fertilizer on Grass Seed Production - Abstract (1968)	Summarized by John Holman; C.L. Canode
1058	F59	Kentucky Bluegrass - Abstract (1996)	Summarized by John Holman; M.H. Hall
1059-1060	F60	Kentucky Bluegrass as an Aid to the Establishment of Crop Management systems; Progress Report FY95	Anne W. Sylvester, Glenn Murray, Jeff Griffin, Vickie Parker-Clarke
1061	F61	Kentucky Bluegrass Common vs. Elite Varieties - Abstract (2002)	D. Brede
1062	F62	Kentucky Bluegrass Seed and Vegetative Responses to Residue Management and Fall Nitrogen - Abstract (1999)	Summarized by John Holman; P.F. Lamb, G.A. Murray
1063	F63	Kentucky Bluegrass Seed Production - Abstract (2001)	Summarized by John Holman; Manitoba Ag & Food
1064	F64	Kentucky Bluegrass Seed Production Characteristics as Affected by Residue Management - Abstract (1983)	Summarized by John Holman; V.G. Hickey, R.D. Ensign
1065-1066	F65	Kentucky Bluegrass Varietal Characteristics for 65 Common Values	
1067-1069	F66	Meeting Potassium Needs for Pacific Northwest Grass Seed Production (2003)	J.M. Hart, D.A. Horneck, M.E. Mellbye, R.L. Mikkelsen
1070-1073	F67	Molecular Studies of Floral initiation in Kentucky Bluegrass; Progress Reports FY94-96	Jeff Griffen, John Fellman
1074	F68	National Kentucky Bluegrass Test - Abstract (1985)	Summarized by John Holman; National Turfgrass Evaluation Program
1075	F69	Abstract: Nitrogen	Summarized by John Holman; G.A. Murray

1076-1080	F70	Nitrogen use, Cycling and Losses in Non-Irrigated Bluegrass Seed Production; Progress Reports FY94-96	John E. Hammel, Robert Mahler, Jon Hutchings
1081-1091	F71	Nonthermal Grass Seed Cropping Systems; Progress Reports FY94-96	Jeffrey J Steiner, Steve M. Griggith, George Mueller-Warrant, Lloyd F. Elliot, Donald B. Churchill, Richard Dick, Elaine Ingham, Paul Jepson, Glenn Fisher, Andrew Moldenke, Thomas G. Chastain, William Young, Mark Mellbye, Gale Gingrich
1092-1093	F72	Northern Idaho Fertilizer Guide. Bluegrass Seed - Abstract (1990)	Summarized by John Holman; R.L. Mahler, R.E. McDole
1094	F73	Nutrient Management for Annual Ryegrass Grown for Seed in Western Oregon - Abstract (2003)	Summarized by John Holman; J. Hart; M. Mellbye; William C. Young III, T.B. Silberstein
1095-1098	F74	Palisade and Field Burning in Creeping Red Fescue in the Willamette Valley (2003)	M.L. Zapiola, T. G. Chastain, W.C. Young III, C.J. Garbacik, T. B. Silberstein
1099-1103	F75	Physiological Response of Creeping red Fescue To stubble Management and Plant Growth Regulators (1996)	P.D. Meints, T.G. Chastain, W.C. Young III, G.M. Banowetz, C.J. Garbacik
1104-1105	F76	Post-harvest Residue Management Effects on Seed yield in Perennial Grass Seed Production - Abstract (1984)	Summarized by John Holman; W.C. Young III, H.W. Younberg, D.O. Chilcote
1106-1107	F77	Post-harvest Residue Management in Kentucky Bluegrass Seed Production - Abstract (1977)	Summarized by John Holman; C.L. Canode, A.G. Law
1108	F78	Post-harvest Residue Management of Creeping Red and Chewing Fescue Seed Crops - Abstract (1998)	Summarized by John Holman; W.C. Young III, G.A. Gingrich, T.B. Silberstein, B.M. Quebbeman
1109-1113	F79	Relationship of Kentucky Bluegrass Cultivars to Mechanical Residue Removal Method and Nitrogen Timing; Progress Report FY96 & OSU Report	Glen A Murray
1114-1122	F80	Residue and Nitrogen Dynamics in Thermal and Non-Thermal Kentucky Bluegrass Seed Production Systems, Presentation (2003)	Karl Umiker, Jodi Johnson-Maynard

1123-1128	F81	Residue Management and Herbicides in Kentucky Bluegrass Seed Production (1995)	G.W. Mueller-Warrant, S.C. Rosato, S.D. Culver, D.D. Coats, F.J. Crowe, T.G. Chastain, W.C. Young III, B.M. Quebbeman, G.L. Kiemnec, G.H. Cook
1129	F82	Residue Management Increases Seed Yield of Three Turfgrass Species on the Canadian Prairies - Abstract (2002)	Summarized by John Holman; B.D. Gossen, J.J. Soroka, H.G. Najda
1130-1137	F83	Residue Management Options for Willamette Valley Grass Seed Crops (1995)	T.G. Chastain, William C. Young III, C.J. Garbacik, B.M. Quebbeman, G.A. Gingrich, M.E. Mellbye, S Aldrich-Markham
1138-1144	F84	Residue Management practices for Grass Seed Cops Grown in the Willamette Valley (1994)	T.G. Chastain, William C. Young III, C.J. Garbacik, B.M. Quebbeman
1145-1148	F85	Residue Management Practices for Grass Seed Cops Grown in the Grande Ronde Valley (1994)	T.G. Chastain, G.L. Kiemnec, G.H. Cook, C.J.Garbacik, B.M. Quebbeman
1149-1156	F86	Residue Management and Stand Age Does Not Affect Seed Quality in Grass Seed Crops (1998)	T.G. Chastain, William C. Young III, C.J.Garbacik, P.D. Mients, T.B. Silberstein
1157-1172	F87	Response of Cool Season Grasses to Foliar Application of Palisade Plant Growth Regulators; Response of Cool Season Grasses to Foliar Application of Apogee Plant Growth Regulators (1999)	T.B. Silberstein, William C. Young III, T.G. Chastain, C.J.Garbacik
1173-1177	F88	Response of Fine Fescue Seed Crop Cultivars to Reside Management Practices in the Willamette Valley	D.D. Shumacher, T.G. Chastain, C.J.Garbacik, William C. Young III
1178-1191	F89	Role of the Root Systems in the Productivity of Grass Seed Crops; Progress Report FY00; OSU 1998-1999 Reports	T.G. Chastain, W.C. Young III, C.J. Garbacik, T.B. Silberstein, C.A. Mallory-Smith
1192-1193	F90	Runoff, Soil Erosion, and Quality of Runoff Water as Affected by Bluegrass Seed Production in the Rotation - Abstract (1980)	Summarized by John Holman; D.K. McCool, R.I. Papendick
1194-1198	F91	Secondary Impacts of N in a First Year Seeding of Kentucky Bluegrass (2003)	D.A. Horneck
1199	F92	Seed Yield of Kentucky Bluegrass as Affected by Post-Harvest Residue Removal (1983)	Summarized by John Holman; R.D. Ensign, V.G. Hickey, M.D. Bernardo

1200-1201	F93	Shoot Development in Kentucky Bluegrass (Poa pratensis L.) as Influenced by Post-Harvest Residue Management - Abstract (1976)	Summarized by John Holman; G.M. Picha
1202-1216	F94	Soil Biological, Chemical , and Physical Dynamics During Transition to Nonthermal Residue Grass Seed Systems; Progress Reports FY00, 95-96	R.P. Dick
1217	F95	Some Aspects of the Physiology of the Rhizomes of Poa Pratensis L. - Abstract (1974)	Summarized by John Holman; F. Nyahoza, C.Marshall, G.R. Sager
1218	F96	Stand Thinning Is Seed Production of "Cougar" Kentucky Bluegrass - Abstract (1980)	Summarized by John Holman; D.W. Evans
1219-1121	F97	Stubble Management for Creeping red Fescue and Kentucky Bluegrass Seed Crops	T.G. Chastain, William C. Young III, G.L. Kiemnec, C.J.Garbacik, T.B. Silberstein, G.A. Gingrich, G.H. Cook
1222-1230	F98	Suppression of Kentucky Bluegrass Stands with Herbicides as Part Nonthermal Residue Management; Progress Reports FY03 & FY01	Don Thill, Steve Bateman, Glen Jacklin, Ken Hart, David Mosman, Doug Lustig, Herb Millhorn
1231-1233	F99	Synthetic Genes Useful in Grass Seed Crops; Progress Report FY01	Scoot E. Warnke, Reed E. Barker, Ronald L. Cook
1234-1235	F100	Thatch and Tiller Size as Influenced by Residue Management in Kentucky Bluegrass Seed Production - Abstract (1979)	Summarized by John Holman; C.L. Canode, A.G. Law
1236-1241	F101	Use of the Nmin Soil Test to Predict N Fertilizer Needs for Direct-Seed Winter Wheat Following Grass Seed Crops in the Willamette Valley (2003)	N.W. Christenson, M.L. Fery, M.E. Mellbye, T.B. Silberstein
1242-1245	F102	Water Use of Bluegrass Seed Under Different Residue Managemen Systems; Progress Reports FY95-96	Alan Mitchell
1246-1250	F103	Weed Control for Nonburn Grass Seed Production; Progress Reports FY94-95	George Mueller-Warrant, Stephen Griffith, Jeffrey Steiner, Donald Churchill, Lloyd Elliott, Thomas G. Chastain, Fred Crowe, Gary Kiemnec

Section G: ISDA Research - Controlling Diseases, Insects, Pests or Weed Infestations (labeled: RC)

1251-1260	G1	Alternative to Burning for Goatgrass Control (2001); Final Report and Project Summary	Jon Jones
1261	G2	Alternative to Burning and Weed Control Research in Bluegrass Seed Production - Abstract (1977)	Summarized by John Holman; R.D Ensign, G.A. Lee

1262-1263	G3	Alternatives to Open Field Burning of Grass Seed Field Residues - Abstract (1976)	Summarized by John Holman; D, Adams, A.G. Law, C.L. Canode, M. Jensen, D.K., McCool, R.I. Papendick, R.D. Oetting, C. Anderson, M. Wirth, C. Burt
1264-1266	G4	Annual Bluegrass Response to Growth Regulators (2001)	B.D. Brewster, C.A. Mallory-Smith, C.M. Cole
1267-1271	G5	Annual Bluegrass Suppression with Herbicides (1998)	G.W. Mueller-Warrant
1272-1273	G6	Cereal Leaf Beetle in Oregon: Potential Impacts on Grass Seed Production; Progress Report FY03	Sujaya Roa
1274-1276	G7	Cloning Pseudomonas Fluorescens Genes that Specifically Block Weed Seed Germination; Progress Report FY00	Dallice Mills
1277-1283	G8	Comparing Invasive and Opportunistic weeds in Grass Seed Crops (1998)	G.W. Mueller-Warrant
1284-1285	G9	Continued Development of a Bioherbicide for Control of Grassy Weeds in Grass Seed Cropping Systems; Progress Report FY01	Dallice Mills
1286-1288	G10	Control of Grassy Weeds: Development of a Novel, Highly Specific, Naturally Occurring Bioherbicide; Progress Report FY03	Donald Armstrong, Dallice Mills
1289-1290	G11	Control of Witchgrass on Fields of Seeding Kentucky Bluegrass - Abstract (1977)	W.C.Robocker, C.L. Canode
1291-1298	G12	Disease Control in Bluegrass Cropping Systems Without Open-Field Burning; Progress Report FY00-01	W.J. Johnston, J.W. Sitton
1299-1300	G13	Diseases and Insects in Dryland and Irrigated Cropping Systems Without Grass Burning; Progress Report FY96	W.J. Johnston, J.W. Sitton, M.D. Butler
1301-1302	G14	Diseases In Dryland and Irrigated Cropping Systems Without Grass Burning; Progress Report FY94-95	W.J. Johnston, J.W. Sitton
1303	G15	Effect of Temperature and Post Harvest Field Burning of Kentucky Bluegrass on Germination of Sclerotia of Claviceps Purpurea - Abstract (1996)	Summarized by John Holman; W.J. Johnston, C.T. Golob, J.W. Sitton, T.R. Schultz
1304-1307	G16	Endophyte Toxins in Grass Seed Fields and Straw - Effects on Livestock (2003)	S. Aldrich-Markham, G. Pirelli, A.M. Craig

1308-1309	G17	Ergot Level Effect of Seed Stock on Disease Incidence in Kentucky Bluegrass (1996)	M.D. Butler, Fred Crowe, S.C. Alderman
1310-1317	G18	Evaluations of Fungicides for Control of Ergot in Kentucky Bluegrass (1996-1998)	M.D. Butler, N.A. Farris, S.C. Alderman, F.J.Crowe
1318-1333	G19	Evaluations of Fungicides for Control of Powdery Mildew in Kentucky Bluegrass Seed Production in Central Oregon (1998-2000 & 2001-2002)	M.D. Butler, C.K. Campbell, N.A. Farris, R.J. Burr
1334-1344	G20	Evaluation of Herbicides for Control of Rough Bluegrass and Injury to Kentucky Bluegrass (1996-1998)	M.D. Butler, N.A. Farris
1345-1349	G21	Evaluations of Herbicides for Effect on Seed Set in Kentucky Bluegrass and Rough Bluegrass Seed Production (2001-2003)	M.D. Butler, J.L. Carroll, R.J. Burr, C.K. Campbell
1350-1351	G22	Fire and Flame for Plant Disease Control - Abstract (1976)	Summarized by John Holman; J.R. Hardison
1352-1353	G23	Foliar Disease Severity of Grass Seed Crops in the Absence of Burning (1993)	R.E. Welty
1354-1358	G24	Geographic Distribution of Prominent weeds of Grass Seed Production (2002)	G.W. Mueller-Warrant, L.R. Shweitzer, R.L. Cook, A.E. Garay
1359-1368	G25	Grass-Feeding Moths Collected in Kentucky Bluegrass Fields Treated with Post-Harvest Burning or Bale only in the Grande Ronde Valley; Commercial Kentucky Bluegrass Fields of Central and Eastern Oregon (2000-2001)	M.D. Butler, P.C. Hammond
1369	G26	Grass Weed Control in Perennial Ryegrass and Tall Fescue; Progress Report FY96	Carol Mallory-Smith
1370-1375	G27	Impact of Ergot in Kentucky Bluegrass and Nematodes in Perennia Ryegrass on Seed Production in Sustainable Nonthermal Grass Cropping Systems; Progress Report FY94-96	Steve Alderman, Reed Barker
1376-1383	RD28	Insect Control In Kentucky Bluegrass and Fine Leaf Fescue Seed Fields in the Pacific Northwest; Progress Report FY01 & FY03	D.E. Bragg, W.J. Johnston
1384-1396	G29	Insects and Ergot in Kentucky Bluegrass Seed Production Fields in the Pacific Northwest (2002)	Marvin Butler
1397-1399	G30	Insects Associated with Ergot in Kentucky Bluegrass Seed Production (1999)	S.C. Alderman, M.D. Butler, G.C. Fisher
1400-1402	G31	Kentucky Bluegrass Variety Tolerance to Beacon (1996)	G.W.Mueller-Warrant, D.S. Culver, S.C Rosato, F.J. Crowe

1403-1405	G32	Kentucky Bluegrass Variety Tolerance to Primisulfuron (1997)	G.W.Mueller-Warrant, D.S. Culver, S.C Rosato, F.J. Crowe
1406-1411	G33	Microorganisms and Sustainable Agriculture; Progress Report FY94-96	Lloyd F. Elliot, William Horwath, Donald Churchill, Stephen Griffith, George Mueller, Jeffery Steiner, Steve Alderman, Ann Kennedy, Fred Crowe
1412-1415	G34	Reducing Herbicide Use and Surface Water Pollution With Vegetative Waterways; Progress Report FY03	Jed Colquhoun
1416-1417	G35	Suppressing the Growth of Annual Bluegrass (1998)	A.S. Herbert, G.M. Walker, M.E. Mellbye
1418	G36	Wild Oat Control in Kentucky Bluegrass and Perennial Ryegrass - Abstract (1975)	Summarized by John Holman; W.O. Lee

Section H: ISDA Research - Economic Reports & All Encompassing Reports (labeled: RE)

1419-1431	H1	Agronomic Factors Influenced By Non-burn Residue Management Systems (2003)	John Holman
1432-1434	H2	Alternative to Thermal Treatment of Grass Seed - Presentation (2003)	Joe McCaffrey
1435-1461	H3	Assessment of Non-Thermal Bluegrass Seed Production - Abstract & Report (2004)	Summarized by John Holman; Larry W. Van Tassel
1462-1479	H4	Certifying Alternatives to Grass Filed Burning - Final Report (1998)	Department of Ecology, Washington State
1480-1488	H5	Crop Profile for Grass Seed in Idaho (2000)	Samuel Fuchs
1489-1490	H6	Diamond–S Farms Inc. - Letter (2003)	Art Schultheis
1491-1492	H7	Earn Less Without Field Burning - Article (2004)	Bill Loftus
1493	H8	Economics of Grass Seed Production in the Inland Pacific Northwest - Abstract (1976)	Summarized by John Holman; L.A. Burt, M.E. Wirth
1494-1544	H9	The Effect of the “No Burn Ban” on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State - Abstract & Report (2001)	Summarized by John Holman; Herbert R. Hinman, Alan Screiber
1545	H10	Environment, Economy, and the Grass Seed Industry - Abstract (1983)	Summarized by John Holman; Intermountain Grass Growes

1546-1652	H11	Estimates of the Benefits and Costs from Reductions in Grass Seed Filed Burning - Abstract & Report (1997)	Summarized by John Holman; David Holland, Kathleen Painter, R. Douglas Scott; Phillip Wandschneider, David Willis
1656-1683	H12	Estimates of the Costs and Benefits of the Rule to Certify Alternative to Grass Field Burning (1998)	Department of Ecology, Washington State
1684	H13	Ecology Ends Most Grass Seed Field Burning in Washington State Press Release (1998)	Jani Gilbert
1685	H14	Ecology Speeds Up Phase Out of Grass field Burning - Press Release (1997)	Jani Gilbert
1686-1690	H15	Economic and Environmental Impacts of Increased Burning Restrictions (1997)	Kathleen Painter
1691-1697	H16	Economic Impacts of Non-Burn Conservation Practices on Western Oregon Perennial Grass Seed Production (2001)	J.J. Steiner, S.M. Griffith, G.W. Mueller-Warrant, G.W. Whittaker, G.M. Banowetz
1698	H17	Economics of Grass Seed Production in the Inland Pacific Northwest (1976)	Summarized by John Holman; L.A. Burt, M.E. Wirth
1699-1707	H18	Economic Value of Burning Bluegrass Residue: Current Status - Presentation (2001)	L.W. Van Tassel
1708-1711	H19	Economic Viability of Washington Grass Seed Industry Using Current Residue Management Methods; Progress Report FY01	Herbert R. Hinman, Alan Screiber
1712-1719	H20	Enterprise Budget: Bluegrass Seed Establishment, Eastern Oregon Region (1995)	Sue Kummerow, Gordon Cook, Brenda Turner
1720	H21	Grass Seed field Burning Regulation Amendment (1996)	Summarized by John Holman
1721-1722	H22	Independent Panel Finds WSU field Burning Study credible - Press Release	Terence L. Day
1723-1727	H23	Integrated Approaches to Sustainable Grass Seed Cropping Systems; Progress Report FY00	Gary Banowitz, Stephen Alderman, Reed Barker, Stephen Griffith
1728-1771	H24	Integrated Management System for Sustained Seed Yield of Kentucky Bluegrass Without Burning; Progress Report FY00-01 & Project Proposal	Don Thill, Bill Johnston
1772-1810	H25	Integrated Residue Management Systems for Sustained Seed Yield of Kentucky Bluegrass Without Burning - Phase I; Progress Report FY03 & Project Proposals	Don Thill, J. Johnson-Maynard, J. McCafffrey, L VanTassell, J.D. Wulfhorst, S. Guy

1811-1817	H26	Jensen Farm Case Study - Direct Seeding in the Inland Northwest (2000)	Ellen B Mallory, Tim Fiez, Roger J. Veseth
1818-1823	H27	Kentucky Bluegrass Seed Production in Central Oregon (2002)	M.D. Butler, J.M.Hart, William C. Young III
1821-1827	H28	Less Fire, More Science for Grass Growers (1997)	Kathryn Barry Stelljes
1828-1830	H29	Maintaining Grass Seed Farm Profits by Integrating Conservation Practices; Progress Report FY03	Mark Mellbye, Guillermo Giannico, Jeffery Steiner
1831-1838	H30	Mosman Farm Case Study - Direct Seeding in the Inland Northwes (2001)	Ellen B Mallory, Tim Fiez, Roger J. Veseth
1839-1845	H31	Non Cereal Crops – Best Management Practices Guidance	
1846-1851	H32	Public Response to Kentucky Bluegrass Field Burning in North Idaho - Project Proposal (2003)	J.D. Wulfhorst, Larry Van Tassel
1852-1855	H33	Putting Out the (Grass) Fire (1997)	David Elstein
1856-1867	H34	Quantifying Emissions from Kentucky Bluegrass Field Burning; Progress Reports FY00-01 & FY03	W.J Johnston, M.D. Schaaf
1868-1957	H35	Quantifying Post Harvest Emissions From Bluegrass Seed Production Field Burning - Project Proposal & Report (2004)	W.J Johnston, C.T. Golob, M.D. Schaaf
1958-1965	H36	Riggers Farm Case Study - Direct Seeding in the Inland Northwest (2000)	Ellen B Mallory, Tim Fiez, Roger J. Veseth
1966-1973	H37	Schultheis Farm Case Study - Direct Seeding in the Inland Northwest (2000)	Ellen B Mallory, Tim Fiez, Roger J. Veseth
1974	H38	Smoke Management - Abstract (1985)	Summarized by John Holman
1975	H39	Smoke Management Plan for Field Burning in Kootenai and Benewah Counties, Idaho - Abstract (1985)	Summarized by John Holman; Idaho Department of Health and Welfare Division of Environment Air Quality Bureau
1976	H40	Smoke Management Plan for Field Burning in Northern Idaho - Abstract (1982)	Summarized by John Holman; Idaho Air Management Services Engineering-Science Inc.
1977	H41	1999 South Central Idaho Crop Costs and Returns Estimate - Abstract (1999)	Summarized by John Holman; R. L. Smathers, C.L. Falen, C. Wilson Gray

1978-1979	H42	Spokane Area's Bluegrass Seed Industry Goes Up In Smoke: State's Ban on Field Burning Drives Production to Idaho - Article (2002)	Associated Press
1980-1991	H43	Thermal Kentucky Bluegrass Post-Harvest Residue Management (2003)	John Holman
1992-2006	H44	University of Idaho Kentucky Bluegrass Extension and Research Update for North Idaho - Presentations (2004)	John Holman

Section I: ISDA Research - Miscellaneous (labeled: RM)

2007-2022	I1	Canola Production	Alan Grombacher, Len Nelson; E.S. Oplinger, L.L. Hardman, E.T. Gritton, J.D. Doll, K.A. Kelling
2023-2037	I2	RUSLE: Revised Universal Soil Loss Equation	National Sedimentation Laboratory
2038-2051	I3	Quinoa Corporation; Northern Quinoa Corporation; Development of Superior Hybrid and Inbred Quinoa Varieties for Colorado;	S.M. Ward
2052-2062	I4	Spelt – What Is It?	J.T. Hoagland

Section J: 2003 Administrative Record

2063-2088	J1	Assessment of Non-Thermal Bluegrass Seed Production (2002)	Larry W. Van Tassell
2089-2092	J2	Declaration of Nick Lawson (June 24, 2002)	Nick Lawson
2093-2100	J3	Declaration of Arthur Schultheis (July 4, 2002)	Arthur Schultheis
2101-2103	J4	Letter to Mr. L. John Iani, Regional Administrator, U.S. EPA (February 16, 2003)	Arthur Schultheis
2104-2110	J5	Declaration of Wayne R. Meyer (July 3, 2002)	Wayne R. Meyer
2111-2120	J6	Research Project: Integrated Management System for Sustained Seed Yield of Kentucky Bluegrass Without Burning	Donn Thill, Glen Murray, Bill Johnston
2121-2138	J7	Kentucky Bluegrass Seed and Vegetative Responses to Residue Management and Fall Nitrogren (1999)	P.F. Lamb, G.A. Murray

2139-2140	J8	Grass Seed Cropping for Sustainable Agriculture – Plant Physiology; Progress Reports FY 94	Stephen M. Griffith, Jeffrey Steiner, Glen M. Murray, Allan Mitchell, Dale Coats
2141-2144	J9	Cultivar Identification and on Farm Technology For Sustained Kentucky Bluegrass Seed Production; Progress Reports FY 94	Glen A. Murray, William J. Johnston
2145-2146	J10	Diseases in Dryland and Irrigated Cropping Systems without Grass Burning; Progress Reports FY 95	W. J. Johnston, J. W. Sitton
2147-2148	J11	Cultivar Identification and on Farm Technology For Sustained Kentucky Bluegrass Seed Production; Progress Reports FY 95	Glen A. Murray, William J. Johnston
2149-2151	J12	Kentucky Bluegrass as an Aid to the Establishment of Crop Management Systems; Progress Reports FY 95	Anne W. Sylvester
2152-2153	J13	Diseases and Insects in Dryland and Irrigated Cropping Systems Without Grass Burning; Progress Reports FY 96	W. J. Johnston, J. W. Sitton, M.D. Butler
2154-2155	J14	Cultivar Identification and on Farm Technology For Sustained Kentucky Bluegrass Seed Production; Progress Reports FY 96	Glen A. Murray, William J. Johnston
2156-2175	J15	Relationship of Kentucky Bluegrass Cultivars to Mechanical Residue Removal Method and Nitrogen Timing	Glen A. Murray
2176-2392	J16	Concise Explanatory Statement - Agricultural Burning - Grass Seec Field Burning Alternative Certification Amendment (1998)	Washington State Department of Ecology Air Quality Program
2393-2556	J17	Preliminary Injunction Hearing Held Before the Honorable Edward J. Lodge at Coeur D’ Alene, Idaho (July 10, 2002)	
2557-2700	J18	Lawrence (“Bud”) Moon, Jr., et al., vs. North Idaho Farmers Association, et al.; Deposition of C. Richard Shumway, Ph.D. taker on behalf of the Defendants Wayne Meyer, et al. (May 23,2003)	
2701-2801	J19	Estimates of the Benefits and Costs From Reductions in Grass Seec Field Burning (1997)	AG ECON Washington State University
2802-2854	J20	KBG 02 06 03 EndNote	
2855-2904	J21	The Effect of the “No-Burn Ban” on the Economic Viability of Producing Bluegrass Seed in Select Areas of Washington State, Farm Business Management Reports (2001)	Herbert R. Hinman, Herbert R. Hinman, Alan Schreiber
2905-2909	J22	Seed Physiology, Production & Technology Residue Management Strategies for Kentucky Bluegrass Seed Production (1997)	T.G. Chastain, G.L. Kiemnec, G.H. Cook, C.J. Garbacik, B.M. Quebbeman, F.J. Crowe

2910-2914	J23	Grass Seed Production in the Absence of Open-Field Burning (1991)	D.O. Chilcotc, W.C. Young III
2915-2916	J24	Email from Lee Halper to ISDA Director, Patrick Takasugi (July 9, 2003)	Lee Halper
2917-2920	J25	July 14, 2003 letter from Patti Gora, Safe Air For Everyone.	Patti Gora
2921-2925	J26	Idaho Attorney General Opinion No. 01-3, August 3, 2001.	Alan G. Lance
2926-2933	J27	Schultheis Farm Case Study - Direct Seeding in the Inland Northwest (2000)	Ellen B. Mallory, Roger J. Veseth, Tim Fiez, R. Dennis Roe, Donald J. Wysocki
2935	J28	Changing for the Better (February 2002)	Case International Harvester Magazine
2936-2947	J29	Alternatives to Open Field burning: Yield Analysis of Mechanically Dethatched Gluegrass (November 1992)	Art Krenzel, Phoenix Industries, Inc., Lebanon, Oregon,
2948-2955	J30	Composting Grass Seed Straw (August 1996)	T.G. Edgar
2956-2965	J31	Estimates of the Benefits and Costs from Reductions in Grass Seed Field Burning, Executive Summary (December 27, 1996)	David Holland, Kathleen Painter, R. Douglas, Scott, Philip Wandschneider, and David Willis, Washington State University.
2966-2967	J32	Independent Panel Finds WSU Field Burning Study Credible (October 2, 1997)	Press Release, College of Agriculture and Home Economics, WSU
2968-2969	J33	Oregon’s Straw Industry Hits a Milestone (July 10, 2003)	Mitch Lies, Capital Press
2970-2979	J34	Declaration of Dr. Richard Shumway (May 30, 2002)	Dr. Richard Shumway
2980-2981	J35	Memo to Tom Fitzsimmons – Grass Seed Filed Burning Rule – Certifying an Alternative to Burning (May 20, 1998)	Joe Williams
2982-2998	J36	Concise Explanatory Statement: Agricultural Burning Grass Seed Field Burning Alternative Certification Amendmen (May 1998)	Department of Ecology, Washington State. Publication number 98-205
2999-3029	J37	Estimates of the Costs and Benefits to the Rule to Certify Alternative to Grass Field Burning (May 1998)	Department of Ecology, Washington State

3030-3196	J38	Appendix B - Research on Alternatives for the Open Burning of Grass Seed Fields of the Certifying Alternative to Grass Seed Field Burning: Final Report Appendices (May 1998)	Department of Ecology, Washington State
3197	J39	Chart: 2002 All Gross Data Washington State	Washington Agriculture Statistics Service
3198	J40	Grass and Legume Seed Crops: Acreage, Yield and Production by Counties, Washington, 2000-2001	Washington Agriculture Statistics Service
3199	J41	Top 40 Agricultural Commodities, WA.	Washington Agriculture Statistics Service
3200	J42	Chart: Washington State Total Kentucky Bluegrass Grown, 1989-2002	Washington Agriculture Statistics Service
3201	J43	Chart: Spokane County Yield per Acre of Kentucky Bluegrass, 1989-2002	Washington Agriculture Statistics Service
3202	J44	Chart: Spokane County Kentucky Bluegrass Acres Harvested, 198[illegible] 2002	Washington Agriculture Statistics Service
3203	J45	Total Value of Production and Value per Harvested Acre, Washington, 1999-2001	Washington Agriculture Statistics Service
3204-3205	J46	Bluegrass Growers See Value in Waste Straw (April 18, 2002)	John Stucke, Spokesman Review
3206-3218	J47	Declaration of Dr. Paul Meints (May 31, 2002)	Paul D. Meints
3219-3231	J48	Declaration of Art Krenzel (June 3, 2002)	Art Krenzel